# Analysis of viral immunity models

## Contents



## Overview

This document goes over the analysis of the model results from the viral mediated immue model. This was not included in the manuscript. In this document, the parameters are plotted and the mse are compared between this and cytolytic immune model.

## Viral immune model results

### Fitted model parameters

| | PatientID2 | theta | log10KV | gammaX100 | mse |
|---|---|---|---|---|---|
| 1 | A | 3.24 | 3.87 | 2.06 | 39.23 |
| 2 | B | 0.68 | 5.89 | 0.70 | 31.73 |
| 3 | C | 1.07 | 5.06 | 0.68 | 27.76 |
| 4 | D | 10.71 | 10.00 | 0.11 | 28.68 |
| 5 | E | 2.40 | 5.89 | 1.17 | 10.69 |
| 6 | F | 6.57 | 3.88 | 2.29 | 17.48 |
| 7 | G | 3.47 | 6.23 | 2.35 | 16.23 |
| 8 | H | 100.00 | 8.20 | 0.12 | 22.48 |
| 9 | I | 1.74 | 4.64 | 0.87 | 12.79 |
| 10 | J | 3.37 | 4.97 | 1.47 | 17.32 |
| 11 | K | 2.35 | 5.17 | 1.34 | 20.80 |
| 12 | L | 3.94 | 5.23 | 1.25 | 14.04 |
| 13 | M | 15.24 | 4.90 | 2.94 | 9.10 |
| 14 | N | 4.27 | 5.90 | 3.40 | 6.74 |

Table 1: Fits from viral mediated immune model

### Simulated data fit compared to episode data (Figure 3)

(also saves figure results_figures/viral_model_fits.pdf that displays parameter values, R0 along with time series plots. This chunk has eval = F in the code.)

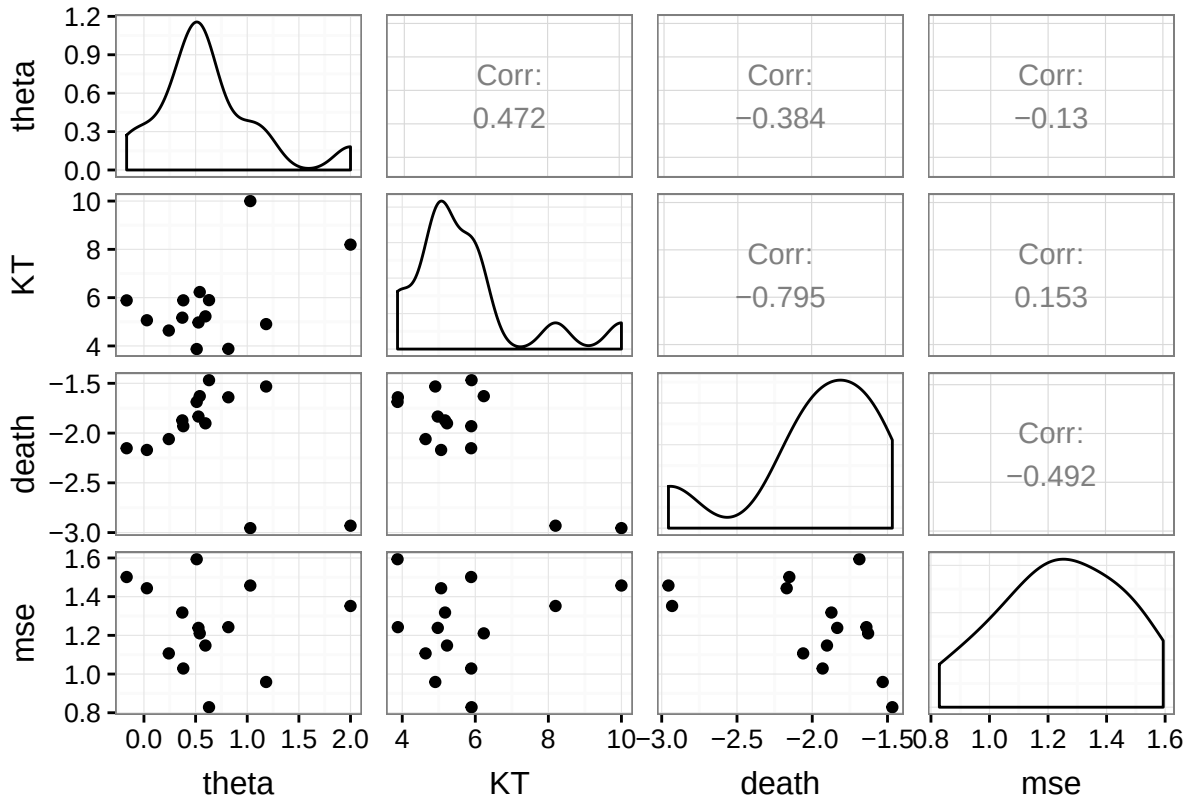



Figure 1: Distribution and correlation of fitted immune parameters (all transformed log10)

## Compare to cytolytic model

The KI and KV vary because units are different (there is more virus). The lifespan of the immune effectors is pretty stable between models. The MSE is very correlated showing that distinguishing the models without additional constraints is difficult. Infants D and H deviate the most and both had parameter fits on the constraint boundaries (in both models).

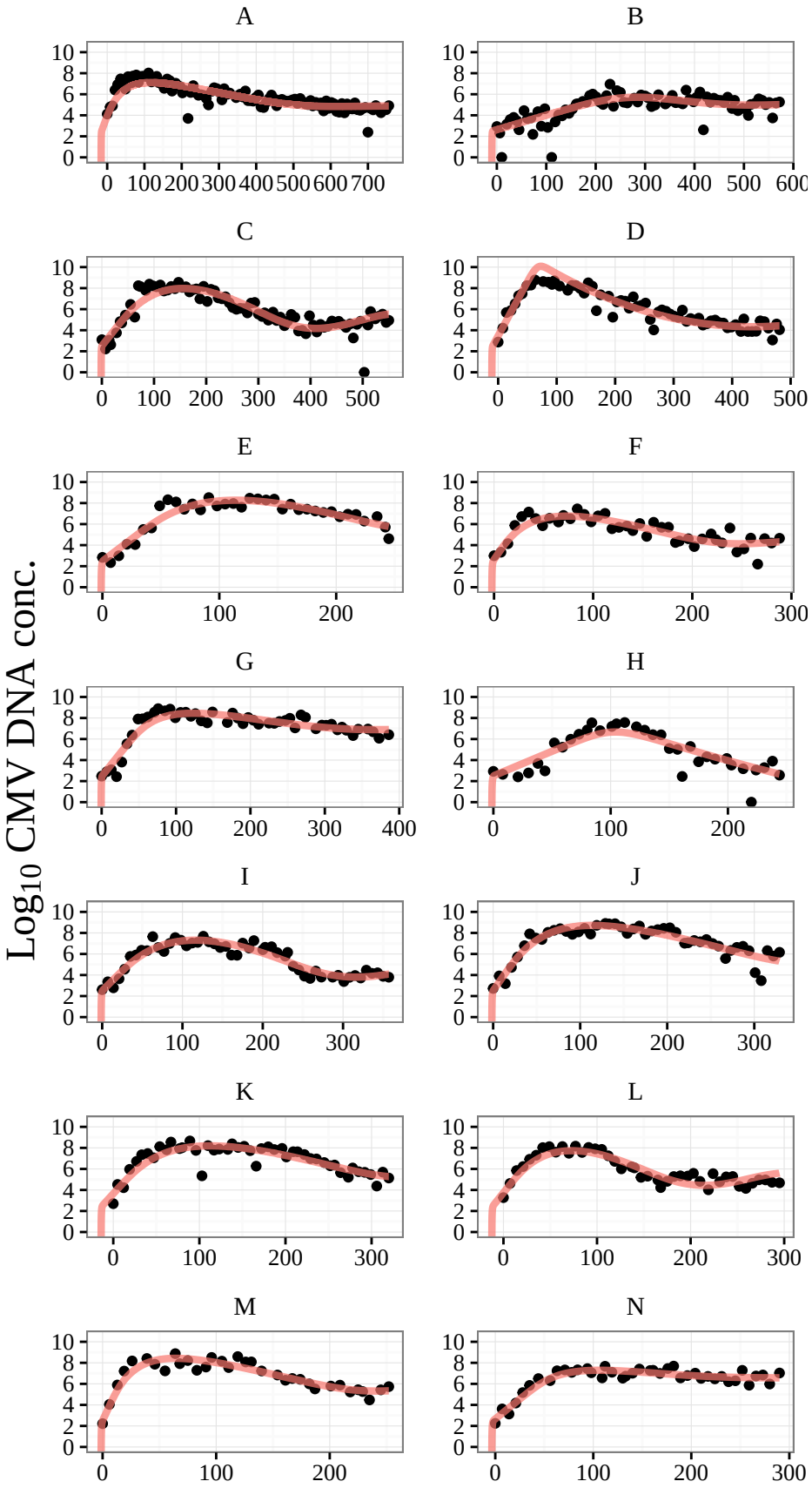
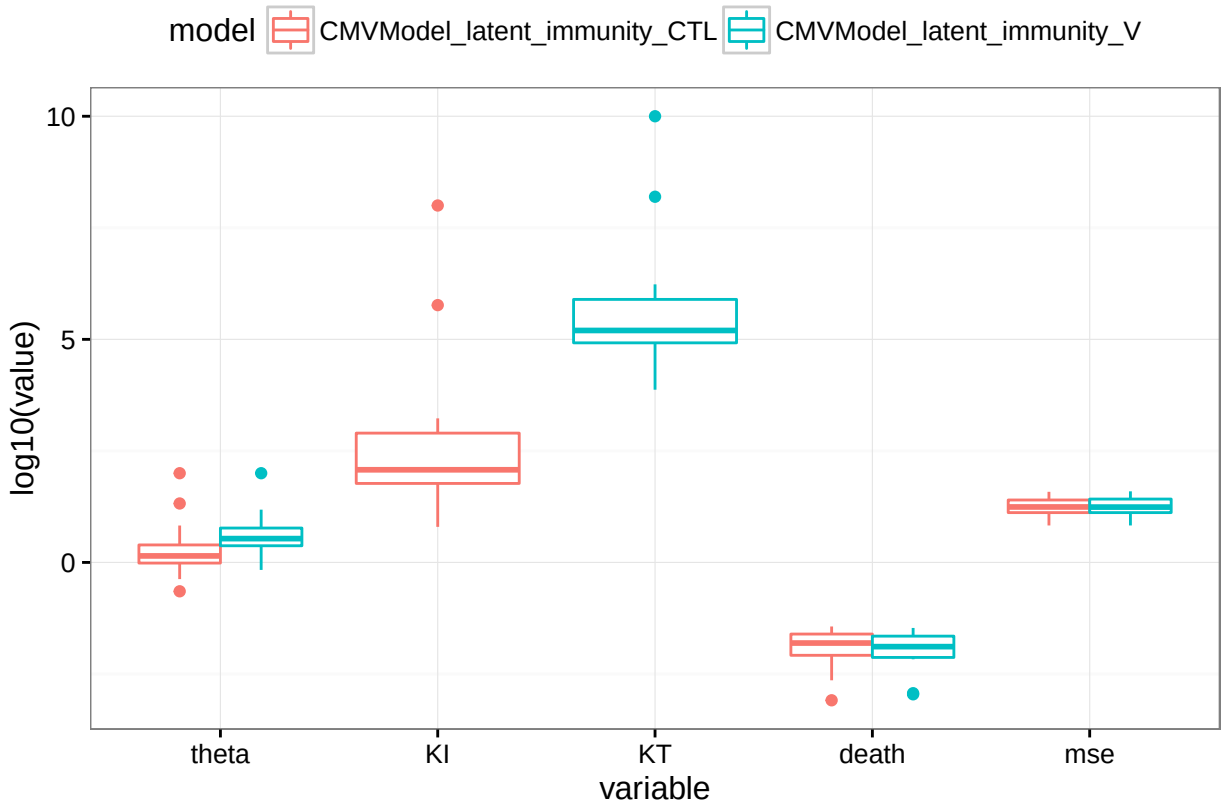
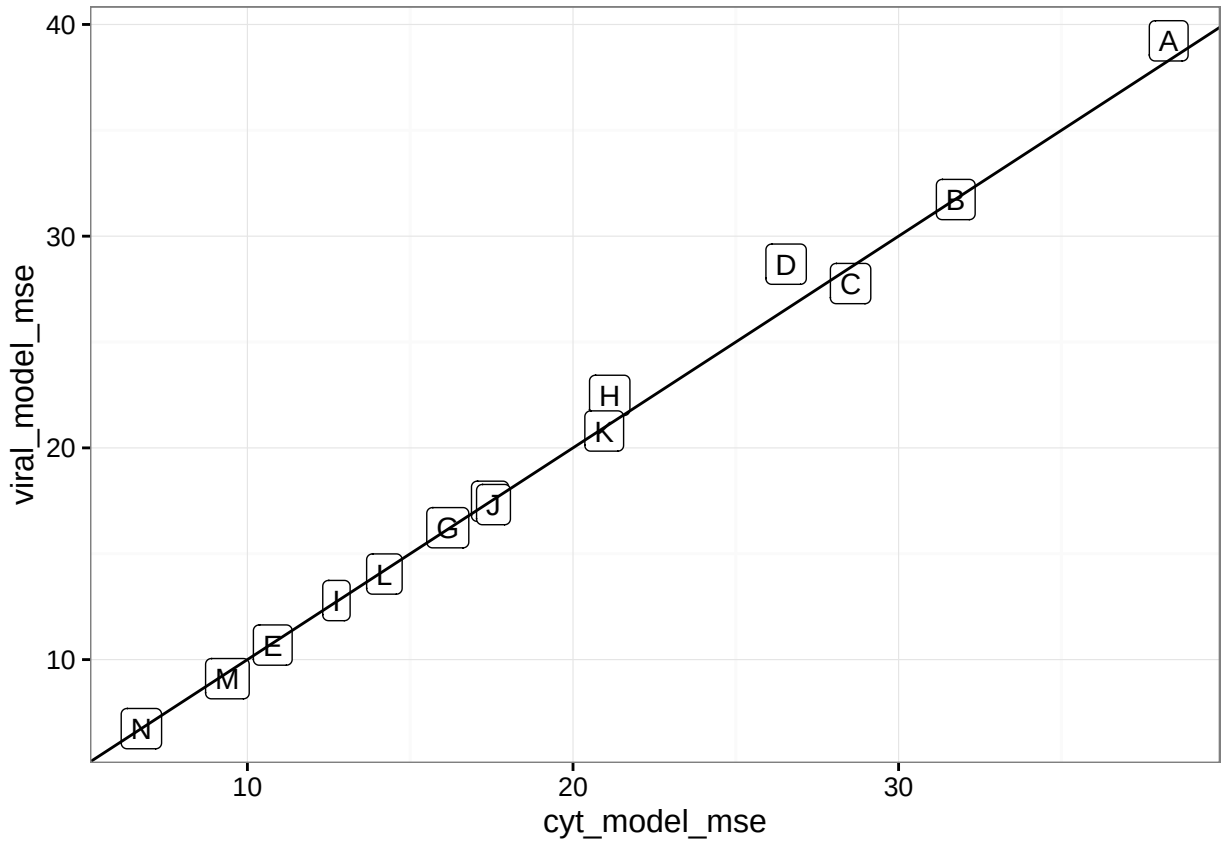



Figure 2: Best immune model fits


model
CMVModel_latent_immunity_CTL
CMVModel_latent_immunity_V
log10(value)
10
5
0
theta
KI
KT
death
mse
variable


viral_model_mse
40
30
20
10
10
20
30
cyt_model_mse
A
B
C
D
H
K
J
G
L
I
E
M
N